

## ***Interactive comment on “Gradient flux measurements of sea-air DMS transfer during the Surface Ocean Aerosol Production (SOAP) experiment” by Murray J. Smith et al.***

**D.T. Ho (Referee)**

david.ho@hawaii.edu

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Smith et al. have written a nice paper with some interesting new results. They use 6 deployments of a catamaran during the Surface Ocean Aerosol Production (SOAP) study on the Chatham Rise to make atmospheric profile measurements of DMS at 4 different heights. These DMS measurements were then used with the gradient flux (GF) technique to determine DMS fluxes, and the results compared with previously published DMS fluxes determined using eddy covariance (EC) on the same cruise.

It is great to be able to compare independent measurements of gas fluxes (and gas transfer velocities) from the same cruise. Over the ocean, GF is a technique that has

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not been used as frequently as EC due to some technical challenges, and Smith et al. seemed to have been careful with their data analysis, and to point out the caveats.

There are three significant results from this paper: 1) When  $u^*$  from EC is used in the GF calculations (as opposed to bulk formulae  $u^*$ ), the DMS fluxes from EC and GF are comparable, 2) there are conditions under which the EC and GF data agree, but deviate from the NOAA COAREG parameterization, and 3) we are not at the point yet where we can parameterize gas transfer velocity with turbulent kinetic energy dissipation rate in the ocean.

The paper is laid out in a logical way, and written in a concise manner. I have no changes to suggest (except maybe make Figure 6 square, since it is a one-to-one comparison). I recommend that it be published as is.

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